Homework Assignment #5
22.105
Electromagnetic Interactions

Fall 2005

Distributed: Tuesday, November 14, 2005

Due: Tuesday, November 21, 2005

Problem 1

Consider a semi-infinitely long cylindrical coaxial transmission line as discussed in class driven by a voltage $Ve^{-i\omega t}$. Assume that the material between the conductors has permeability μ, permeativity ε, and a small resistivity η. Calculate the attenuation length as a function of frequency and the properties of the transmission line.

Problem 2

Calculate the dispersion relation for TM waves in a rectangular waveguide. Evaluate the lowest frequency that can propagate and compare it with the TE mode.

Problem 8.4 (Jackson)